

2) Amendment to the Claim

Please replace the original claim by the claim currently amended.

CLAIM

~~[What I claim as my invention is:]~~

1) (Original) ~~[An internal combustion engine of open closed cycle and binary fluid with the principal mechanical parts driven by gyratory screws with external synchronized timing gears, characterized for an air compression cooled by water with flow and pressure air modulation, regenerative air heating, gases heating for continuous combustion, gas dry expansion from constant maximum temperature, gases and steam superheated re-heating by continuous combustion, gas and steam superheated dry expansion from constant maximum temperature, and exhaust gases cooling for condensation and water recovery.]~~

Lelio Dante Greppi

CLAIM

What is claim is:

1) (*Currently amended*) An internal combustion engine of open closed cycle and binary fluid comprising:

a dry air filter for cleaning the dust of the aspired atmospheric air;

a water-injection twin screw compressor that compresses air and pumps water, oil-free, in a single stage, with air flow from 10 percent up to 100 percent, air pressure ratio from 4:1 up to 20:1 and water mass injected from 0 up to 200 percent of aspired air mass;

a water separator of high pressure to remove the water at high pressure of the compressed air;

a static regenerator, high pressure side, for recuperative heating of the compressed air;

a first combustor to burn different types of liquid or gaseous fuels for heating the preheated compressed air in a continuous combustion;

a first dry twin screw expander with fixed expansion ratio for a first expansion stage of hot gasses from the first combustor at constant maximum peak temperature, this expander drives the compressor;

a damper control, the amount of hot gasses allowed into a second combustion chamber bypassing hot gas to a regenerative catalytic reactor;

a second combustor to burn different types of liquid or gaseous fuels for reheating the hot gasses and steam injected in a continuous

combustion, the fuel injected in the second combustor and the steam injected are cut of simultaneously in idle run;

a second dry twin screw expander with fixed expansion ratio for a second expansion stage of hot gasses and steam from the second combustor at constant maximum peak temperature, this second expander has the output power shaft;

a regenerative catalytic converter and thermal reactor recovers heat increasing the temperature of exhaust gasses by means of the post combustion of hydrocarbon and carbon monoxide and reducing the nitrogen oxides;

a regenerator, low side, where the hot exhaust gasses is cooled and the water vapor is condensed;

a steam separator, is a large insulated pressure vessel, partially filled with hot water, when steam supply exceeds demand, the high-pressure steam is to injected into the steam separator, the steam condensed gives up its latent heat, to raise the pressure, temperature, and heat content of the water body, when the steam demand exceeds the supply, the pressure in the accumulator drops and the additional required steam flashes from the water, taking back the heat previously stored; when the supply is superheated steam the accumulator is dried and if the supply exceeds demand, the steam is injected in the medium exchanger of the regenerator, the steam is cooled and the heat is recovered;

an ejector combines a high-pressure fluid with a low-pressure fluid to form an intermediate-pressure fluid supply;

a condenser, cooled by natural or forced circulation of atmospheric air through it to recover water from the exhaust gasses and steam;

a low-pressure water separator, the injected water and the water generated by combustion is removed from the exhaust gasses, then the exhaust gasses are discharged right to the atmosphere;

an insulated water tank with a filter for the solid removal and to neutralize oxides, acid and sulfur dioxide;

a water pump transfer water from the water tank to the water cooler;

a water cooler, cooled by natural or forced circulation of atmospheric air;

a water injection in the compressor for internal cooling;

a water flow control of internal cooling in the two expanders for steam generation;

a steam injector in damper control of hot gasses for second expander.-

Lelio Dante Greppi

CLAIM

What is claim is:

1) An internal combustion engine of open closed cycle and binary fluid comprising:

a dry air filter for cleaning the dust of the aspired atmospheric air;

a water-injection twin screw compressor that compresses air and pumps water, oil-free, in a single stage, with air flow from 10 percent up to 100 percent, air pressure ratio from 4:1 up to 20:1 and water mass injected from 0 up to 200 percent of aspired air mass;

a water separator of high pressure to remove the water at high pressure of the compressed air;

a static regenerator, high pressure side, for recuperative heating of the compressed air;

a first combustor to burn different types of liquid or gaseous fuels for heating the preheated compressed air in a continuous combustion;

a first dry twin screw expander with fixed expansion ratio for a first expansion stage of hot gasses from the first combustor at constant maximum peak temperature, this expander drives the compressor;

a damper control, for the regulation of the amount of hot gasses allowed into the second combustion chamber, bypassing hot gasses to a regenerative catalytic reactor;

a second combustor to burn different types of liquid or gaseous fuels for reheating the hot gasses and steam injected in a continuous

combustion, the fuel injected in the second combustor and the steam injected are cut off simultaneously in idle run;

a second dry twin screw expander with fixed expansion ratio for a second expansion stage of hot gasses and steam from the second combustor at constant maximum peak temperature, this second expander has the output power shaft;

a regenerative catalytic converter and thermal reactor recovers heat increasing the temperature of exhaust gasses by means of the post combustion of hydrocarbon and carbon monoxide and reducing the nitrogen oxides;

a regenerator, low side, where the hot exhaust gasses is cooled and the water vapor is condensed;

a steam separator, is a large insulated pressure vessel, partially filled with hot water, when steam supply exceeds demand, the high-pressure steam is injected into the steam separator, the steam condensed gives up its latent heat, to raise the pressure, temperature, and heat content of the water body, when the steam demand exceeds the supply, the pressure in the accumulator drops and the additional required steam flashes from the water, taking back the heat previously stored; when the supply is superheated steam the accumulator is dried and if the supply exceeds demand, the steam is injected in the medium exchanger of the regenerator, the steam is cooled and the heat is recovered;

an ejector combines a high-pressure fluid with a low-pressure fluid to form an intermediate-pressure fluid supply;

a condenser, cooled by natural or forced circulation of atmospheric air through it to recover water from the exhaust gasses and steam;

a low-pressure water separator, the injected water and the water generated by combustion is removed from the exhaust gasses, then the exhaust gasses are discharged right to the atmosphere;

an insulated water tank with a filter for the solid removal and to neutralize oxides, acid and sulfur dioxide;

a water pump transfer water from the water tank to the water cooler;

a water cooler, cooled by natural or forced circulation of atmospheric air;

a water injection in the compressor for internal cooling;

a water flow control of internal cooling in the two expanders for steam generation;

a steam injector in damper control of hot gasses for second expander.-

A handwritten signature in black ink, appearing to read 'Lelio Greppi', with a large, stylized flourish underneath.

Lelio Dante Greppi